

High Efficiency Switching Power amplifier for Earth Radar Observation System (HESPEROS), Phase I

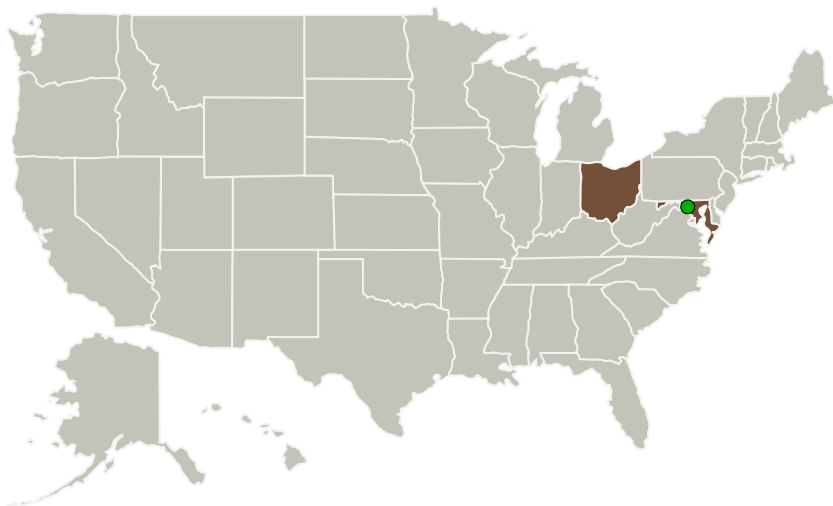
Completed Technology Project (2012 - 2012)



Project Introduction

To meet multiple mission needs with limited resources, NASA's Science Mission Directorate (SMD) is pursuing smaller and more affordable spacecraft. The reduction of size, weight, power, and cost (SWaP-C) of the radio frequency (RF) components required for a particular mission area allows the instrumentation package to be made more compact. In meeting the SWaP-C objectives, RF components will be required to be smaller and more power efficient. To meet the needs of NASA's Earth Science Division, RF components must lead to greater performance than provided by the current state-of-the-art. NuWaves proposes a High Efficiency Switching Power amplifier for Earth Radar Observation Systems (HESPEROS). Several innovative techniques have been identified to increase the efficiency and operational bandwidth of RF power amplifiers (PAs) targeted for radar applications. The amplifier design also incorporates fast turn on and turn off circuits to achieve switching times of less than one microsecond (us). The benefit of such amplifiers in radar applications is the fact that they can be switched off during the receive period to prevent self-generated noise from corrupting the received signal. Also, high-power transmit and receive (T/R) switches at the antenna feed can be eliminated. The advantages of a wideband PA are numerous. A wideband PA enables the design of a multi-band radar, reducing the number of components needed for operation in the P, L, and X bands. A high efficiency PA is also key to reducing battery size and cooling requirements in spaceborne applications. The switching amplifier topology presented in this proposal addresses all the above requirements.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
Nu Waves Ltd.	Lead Organization	Industry	Middletown, Ohio
● Goddard Space Flight Center(GSFC)	Supporting Organization	NASA Center	Greenbelt, Maryland

Primary U.S. Work Locations	
Maryland	Ohio

Project Transitions

February 2012: Project Start

August 2012: Closed out

Closeout Documentation:

- Final Summary Chart(<https://techport.nasa.gov/file/138195>)

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Nu Waves Ltd.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

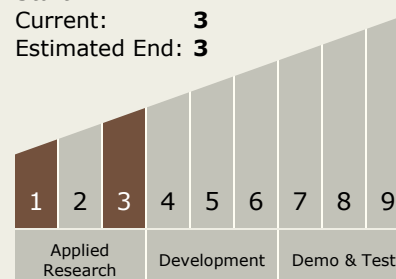
Carlos Torrez

Principal Investigator:

Sal Mendez

Technology Maturity (TRL)

Start: **1**
Current: **3**
Estimated End: **3**



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Technology Areas

Primary:

- TX08 Sensors and Instruments
 - └ TX08.1 Remote Sensing Instruments/Sensors
 - └ TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System